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SAF-B04-002
100 BC Burial Grounds – Soil Full Protocol
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Matt Cutlip (1) mjp 3-29-05 INITIAL/DATE

Jeanette Duncan (2) mjp 3-29-05 INITIAL/DATE

SDG H2998 SAF-B04-002

Sample Location/Waste Site: 100-B-16

Date: 14 March 2005
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 BC Burial Grounds - Soil Full Protocol - Waste Site 100-B-16
Subject: Semivolatile - Data Package No. H2998-LLI (SDG No. H2998)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2998-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
J02FL8	1/25/05	Soil	C	See note 1
J02FL9	1/25/05	Soil	C	See note 1
J02FM0	1/25/05	Soil	C	See note 1
J02FM1	1/25/05	Soil	C	See note 1
J02FM2	1/25/05	Soil	C	See note 1
J02FM3	1/25/05	Soil	C	See note 1

1-Semivolatiles by 8270C.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, December 2001). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

Due to method blank contamination, all di-n-butylphthalate and bis(2-ethylhexyl)phthalate results were raised to the RQL, qualified as undetected and flagged "U".

All other method blank results were acceptable.

Field Blanks

One equipment blank (J02FM3) was submitted for analysis. Diethylphthalate, di-n-butylphthalate and bis(2-ethylhexyl)phthalate were detected in the field blank. Under the BHI statement of work, no qualification is required. All other field blank results were acceptable.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent

recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

All accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

Field Duplicate Samples

One set of field duplicate samples (J02FM1/J02FM2) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. Forty-eight analytes were reported above the RQL. Under the BHI statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data package No. H2998-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to method blank contamination, all di-n-butylphthalate and bis(2-ethylhexyl)phthalate results were raised to the RQL, qualified as undetected and flagged "U".

Forty-eight analytes were reported above the RQL. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 3, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

SEMIVOLATILE DATA QUALIFICATION SUMMARY*

SDG: H2998	REVIEWER: TLI	DATE: 3/14/05	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
bis(2-ethylhexyl)phthalate di-n-butylphthalate	U at RQL	All	Method blank contamination

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG)

Project: BECHTEL-HANFORD													
Laboratory: LLI													
Case:	SDG: H2998												
Sample Number		J02FL8		J02FL9		J02FM0		J02FM1		J02FM2		J02FM3	
Remarks										Duplicate		E. Blank	
Sample Date		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05	
Extraction Date		2/2/05		2/2/05		2/2/05		2/2/05		2/2/05		2/2/05	
Analysis Date		2/4/05		2/4/05		2/4/05		2/4/05		2/4/05		2/4/05	
Semivolatile (8270C)	RDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol	660	360	U	370	U	360	U	390	U	360	U	330	U
bis(2-Chloroethyl)ether	660	360	U	370	U	360	U	390	U	360	U	330	U
2-Chlorophenol	660	360	U	370	U	360	U	390	U	360	U	330	U
1,3-Dichlorobenzene	660	360	U	370	U	360	U	390	U	360	U	330	U
1,4-Dichlorobenzene	660	360	U	370	U	360	U	390	U	360	U	330	U
1,2-Dichlorobenzene	660	360	U	370	U	360	U	390	U	360	U	330	U
2-Methylphenol	660	360	U	370	U	360	U	390	U	360	U	330	U
2,2'-oxybis(1-chloropropane)	660	360	U	370	U	360	U	390	U	360	U	330	U
3 and/or 4-Methylphenol	660	360	U	370	U	360	U	390	U	360	U	330	U
N-Nitroso-di-n-propylamine	660	360	U	370	U	360	U	390	U	360	U	330	U
Hexachloroethane	660	360	U	370	U	360	U	390	U	360	U	330	U
Nitrobenzene	660	360	U	370	U	360	U	390	U	360	U	330	U
Isophorone	660	360	U	370	U	360	U	390	U	360	U	330	U
2-Nitrophenol	660	360	U	370	U	360	U	390	U	360	U	330	U
2,4-Dimethylphenol	660	360	U	370	U	360	U	390	U	360	U	330	U
bis(2-Chloroethoxy)methane	660	360	U	370	U	360	U	390	U	360	U	330	U
2,4-Dichlorophenol	660	360	U	370	U	360	U	390	U	360	U	330	U
1,2,4-Trichlorobenzene	660	360	U	370	U	360	U	390	U	360	U	330	U
Naphthalene	660	360	U	370	U	360	U	390	U	360	U	330	U
4-Chloroaniline	660	360	U	370	U	360	U	390	U	360	U	330	U
Hexachlorobutadiene	660	360	U	370	U	360	U	390	U	360	U	330	U
4-Chloro-3-methylphenol	660	360	U	370	U	360	U	390	U	360	U	330	U
2-Methylnaphthalene	660	360	U	370	U	360	U	390	U	360	U	330	U
Hexachlorocyclopentadiene	660	360	U	370	U	360	U	390	U	360	U	330	U
2,4,6-Trichlorophenol	660	360	U	370	U	360	U	390	U	360	U	330	U
2,4,5-Trichlorophenol*	660	910	U	920	U	900	U	980	U	910	U	830	U
2-Chloronaphthalene	660	360	U	370	U	360	U	390	U	360	U	330	U
2-Nitroaniline*	660	910	U	920	U	900	U	980	U	910	U	830	U
Dimethylphthalate	660	360	U	370	U	360	U	390	U	360	U	330	U
Acenaphthylene	660	360	U	370	U	360	U	390	U	360	U	330	U
2,6-Dinitrotoluene	660	360	U	370	U	360	U	390	U	360	U	330	U

0000094

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG)

Project: BECHTEL-HANFORD													
Laboratory: LLI													
Case:	SDG: H2998												
Sample Number		J02FL8		J02FL9		J02FM0		J02FM1		J02FM2		J02FM3	
Remarks										Duplicate		E. Blank	
Sample Date		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05	
Extraction Date		2/2/05		2/2/05		2/2/05		2/2/05		2/2/05		2/2/05	
Analysis Date		2/4/05		2/4/05		2/4/05		2/4/05		2/4/05		2/4/05	
Semivolatile (8270C)	RDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline*	660	910	U	920	U	900	U	980	U	910	U	830	U
Acenaphthene	660	360	U	330	U	360	U	390	U	360	U	330	U
2,4-Dinitrophenol*	660	910	U	920	U	900	U	980	U	910	U	830	U
4-Nitrophenol*	660	910	U	920	U	900	U	980	U	910	U	830	U
Dibenzofuran	660	360	U	370	U	360	U	390	U	360	U	330	U
2,4-Dinitrotoluene	660	360	U	370	U	360	U	390	U	360	U	330	U
Diethylphthalate	660	360	U	370	U	360	U	390	U	360	U	30	
4-Chlorophenyl-phenyl ether	660	360	U	370	U	360	U	390	U	360	U	330	U
Fluorene	660	360	U	370	U	360	U	390	U	360	U	330	U
4-Nitroaniline*	660	910	U	920	U	900	U	980	U	910	U	830	U
4,6-Dinitro-2-methylphenol*	660	910	U	920	U	900	U	980	U	910	U	830	U
N-Nitrosodiphenylamine	660	360	U	370	U	360	U	390	U	360	U	330	U
4-Bromophenyl-phenyl ether	660	360	U	370	U	360	U	390	U	360	U	330	U
Hexachlorobenzene	660	360	U	370	U	360	U	390	U	360	U	330	U
Pentachlorophenol*	660	910	U	920	U	900	U	980	U	910	U	830	U
Phenanthrene	660	360	U	370	U	360	U	63		360	U	330	U
Anthracene	660	360	U	370	U	360	U	390	U	360	U	330	U
Carbazole	660	360	U	370	U	360	U	390	U	360	U	330	U
Di-n-butylphthalate	660	660	U	660	U	660	U	660	U	660	U	660	U
Fluoranthene	660	360	U	370	U	22		150		360	U	330	U
Pyrene	660	360	U	370	U	18		120		360	U	330	U
Butylbenzylphthalate	660	360	U	370	U	360	U	390	U	360	U	330	U
3,3'-Dichlorobenzidine	660	360	U	370	U	360	U	390	U	360	U	330	U
Benzo(a)anthracene	660	360	U	370	U	360	U	26		360	U	330	U
Chrysene	660	360	U	370	U	360	U	110		360	U	330	U
bis(2-Ethylhexyl)phthalate	660	660	U	660	U	660	U	660	U	660	U	660	U
Di-n-octylphthalate	660	360	U	370	U	360	U	390	U	360	U	330	U
Benzo(b)fluoranthene	660	360	U	370	U	360	U	61		360	U	330	U
Benzo(k)fluoranthene	660	360	U	370	U	360	U	46		360	U	330	U
Benzo(a)pyrene	660	360	U	370	U	360	U	21		360	U	330	U
Indeno(1,2,3-cd)pyrene	660	360	U	370	U	360	U	390	U	360	U	330	U
Dibenz(a,h)anthracene	660	360	U	370	U	360	U	390	U	360	U	330	U
Benzo(g,h,i)perylene	660	360	U	370	U	360	U	390	U	360	U	330	U

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, HSL List

Report Date: 02/09/05 14:13

RFW Batch Number: 0501L688 Client: TNUHANFORD B04-002 H2998 Work Order: 11343606001 Page: 1a

	Cust ID:	J02FL8	J02FL9	J02FL9	J02FL9	J02FM0	J02FM1
Sample Information	RFW#:	001	002	002 MS	002 MSD	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate Recovery	Nitrobenzene-d5	83 %	78 %	67 %	63 %	63 %	63 %
	2-Fluorobiphenyl	89 %	77 %	72 %	67 %	68 %	64 %
	Terphenyl-d14	94 %	84 %	81 %	76 %	78 %	75 %
	Phenol-d5	82 %	74 %	67 %	63 %	57 %	60 %
	2-Fluorophenol	84 %	75 %	68 %	62 %	58 %	62 %
	2,4,6-Tribromophenol	97 %	83 %	85 %	87 %	64 %	69 %
Phenol		360 U	370 U	62 %	61 %	360 U	390 U
bis(2-Chloroethyl)ether		360 U	370 U	370 U	370 U	360 U	390 U
2-Chlorophenol		360 U	370 U	67 %	64 %	360 U	390 U
1,3-Dichlorobenzene		360 U	370 U	370 U	370 U	360 U	390 U
1,4-Dichlorobenzene		360 U	370 U	55 %	57 %	360 U	390 U
1,2-Dichlorobenzene		360 U	370 U	370 U	370 U	360 U	390 U
2-Methylphenol		360 U	370 U	370 U	370 U	360 U	390 U
2,2'-oxybis(1-Chloropropane)		360 U	370 U	370 U	370 U	360 U	390 U
3/4-Methylphenol		360 U	370 U	370 U	370 U	360 U	390 U
N-Nitroso-di-n-propylamine		360 U	370 U	65 %	66 %	360 U	390 U
Hexachloroethane		360 U	370 U	370 U	370 U	360 U	390 U
Nitrobenzene		360 U	370 U	370 U	370 U	360 U	390 U
Isophorone		360 U	370 U	370 U	370 U	360 U	390 U
2-Nitrophenol		360 U	370 U	370 U	370 U	360 U	390 U
2,4-Dimethylphenol		360 U	370 U	370 U	370 U	360 U	390 U
bis(2-Chloroethoxy)methane		360 U	370 U	370 U	370 U	360 U	390 U
2,4-Dichlorophenol		360 U	370 U	370 U	370 U	360 U	390 U
1,2,4-Trichlorobenzene		360 U	370 U	58 %	58 %	360 U	390 U
Naphthalene		360 U	370 U	370 U	370 U	360 U	390 U
4-Chloroaniline		360 U	370 U	370 U	370 U	360 U	390 U
Hexachlorobutadiene		360 U	370 U	370 U	370 U	360 U	390 U
4-Chloro-3-methylphenol		360 U	370 U	74 %	72 %	360 U	390 U
2-Methylnaphthalene		360 U	370 U	370 U	370 U	360 U	390 U
Hexachlorocyclopentadiene		360 U	370 U	370 U	370 U	360 U	390 U
2,4,6-Trichlorophenol		360 U	370 U	370 U	370 U	360 U	390 U
2,4,5-Trichlorophenol		910 U	920 U	920 U	920 U	900 U	980 U

*= Outside of EPA CLP QC limits.

3/12/05

000011

RFW Batch Number: 0501L688 Client: TNUHANFORD B04-002 H2998 Work Order: 11343606001 Page: 1b

Cust ID:	J02FL8	J02FL9	J02FL9	J02FL9	J02FM0	J02FM1
RFW#:	001	002	002 MS	002 MSD	003	004
2-Chloronaphthalene	360 U	370 U	370 U	370 U	360 U	390 U
2-Nitroaniline	910 U	920 U	920 U	920 U	900 U	980 U
Dimethylphthalate	360 U	370 U	370 U	370 U	360 U	390 U
Acenaphthylene	360 U	370 U	370 U	370 U	360 U	390 U
2,6-Dinitrotoluene	360 U	370 U	370 U	370 U	360 U	390 U
3-Nitroaniline	910 U	920 U	920 U	920 U	900 U	980 U
Acenaphthene	360 U	370 U	66 %	62 %	360 U	390 U
2,4-Dinitrophenol	910 U	920 U	920 U	920 U	900 U	980 U
4-Nitrophenol	910 U	920 U	16 %	14 %	900 U	980 U
Dibenzofuran	360 U	370 U	370 U	370 U	360 U	390 U
2,4-Dinitrotoluene	360 U	370 U	67 %	68 %	360 U	390 U
Diethylphthalate	360 U	370 U	370 U	370 U	360 U	390 U
4-Chlorophenyl-phenylether	360 U	370 U	370 U	370 U	360 U	390 U
Fluorene	360 U	370 U	370 U	370 U	360 U	390 U
4-Nitroaniline	910 U	920 U	920 U	920 U	900 U	980 U
4,6-Dinitro-2-methylphenol	910 U	920 U	920 U	920 U	900 U	980 U
N-Nitrosodiphenylamine (1)	360 U	370 U	370 U	370 U	360 U	390 U
4-Bromophenyl-phenylether	360 U	370 U	370 U	370 U	360 U	390 U
Hexachlorobenzene	360 U	370 U	370 U	370 U	360 U	390 U
Pentachlorophenol	910 U	920 U	65 %	80 %	900 U	980 U
Phenanthrene	360 U	370 U	370 U	65 J	360 U	63 J
Anthracene	360 U	370 U	370 U	370 U	360 U	390 U
Carbazole	360 U	370 U	370 U	370 U	360 U	390 U
Di-n-butylphthalate	LLO ~~27~~ JB U	LLO ~~27~~ JB U	20 JB	19 JB	LLO ~~20~~ JB U	LLO ~~22~~ JB U
Fluoranthene	360 U	370 U	370 U	57 J	22 J	150 J
Pyrene	360 U	370 U	64 %	62 %	18 J	120 J
Butylbenzylphthalate	360 U	370 U	370 U	370 U	360 U	390 U
3,3'-Dichlorobenzidine	360 U	370 U	370 U	370 U	360 U	390 U
Benzo(a)anthracene	360 U	370 U	370 U	370 U	360 U	26 J
Chrysene	360 U	370 U	370 U	370 U	360 U	110 J
bis(2-Ethylhexyl)phthalate	LLO ~~41~~ JB U	LLO ~~100~~ JB U	49 JB	39 JB	LLO ~~69~~ JB U	LLO ~~80~~ JB U
Di-n-octyl phthalate	360 U	370 U	370 U	370 U	360 U	390 U
Benzo(b)fluoranthene	360 U	370 U	370 U	370 U	360 U	61 J
Benzo(k)fluoranthene	360 U	370 U	370 U	370 U	360 U	46 J
Benzo(a)pyrene	360 U	370 U	370 U	370 U	360 U	21 J
Indeno(1,2,3-cd)pyrene	360 U	370 U	370 U	370 U	360 U	390 U
Dibenz(a,h)anthracene	360 U	370 U	370 U	370 U	360 U	390 U
Benzo(g,h,i)perylene	360 U	370 U	370 U	370 U	360 U	390 U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

3/12/08

0000012

	Cust ID:	J02FM2	J02FM3	SBLKEI	SBLKEI BS
Sample Information	RFW#:	005	006	05LE0081-MB1	05LE0081-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate Recovery	Nitrobenzene-d5	79 %	75 %	63 %	82 %
	2-Fluorobiphenyl	87 %	75 %	63 %	82 %
	Terphenyl-d14	129 %	103 %	83 %	98 %
	Phenol-d5	84 %	77 %	59 %	76 %
	2-Fluorophenol	89 %	78 %	62 %	77 %
	2,4,6-Tribromophenol	114 %	68 %	66 %	95 %
Phenol		360 U	330 U	330 U	70 %
bis(2-Chloroethyl)ether		360 U	330 U	330 U	330 U
2-Chlorophenol		360 U	330 U	330 U	74 %
1,3-Dichlorobenzene		360 U	330 U	330 U	330 U
1,4-Dichlorobenzene		360 U	330 U	330 U	69 %
1,2-Dichlorobenzene		360 U	330 U	330 U	330 U
2-Methylphenol		360 U	330 U	330 U	330 U
2,2'-oxybis(1-Chloropropane)		360 U	330 U	330 U	330 U
3/4-Methylphenol		360 U	330 U	330 U	330 U
N-Nitroso-di-n-propylamine		360 U	330 U	330 U	76 %
Hexachloroethane		360 U	330 U	330 U	330 U
Nitrobenzene		360 U	330 U	330 U	330 U
Isophorone		360 U	330 U	330 U	330 U
2-Nitrophenol		360 U	330 U	330 U	330 U
2,4-Dimethylphenol		360 U	330 U	330 U	330 U
bis(2-Chloroethoxy)methane		360 U	330 U	330 U	330 U
2,4-Dichlorophenol		360 U	330 U	330 U	330 U
1,2,4-Trichlorobenzene		360 U	330 U	330 U	69 %
Naphthalene		360 U	330 U	330 U	330 U
4-Chloroaniline		360 U	330 U	330 U	330 U
Hexachlorobutadiene		360 U	330 U	330 U	330 U
4-Chloro-3-methylphenol		360 U	330 U	330 U	86 %
2-Methylnaphthalene		360 U	330 U	330 U	330 U
Hexachlorocyclopentadiene		360 U	330 U	330 U	330 U
2,4,6-Trichlorophenol		360 U	330 U	330 U	330 U
2,4,5-Trichlorophenol		910 U	830 U	830 U	830 U

*= Outside of EPA CLP QC limits.

000013

3/12/05

Cust ID:	J02FM2		J02FM3		SBLKEI		SBLKEI BS	
RFW#:	005		006		05LE0081-MB1		05LE0081-MB1	
2-Chloronaphthalene	360	U	330	U	330	U	330	U
2-Nitroaniline	910	U	830	U	830	U	830	U
Dimethylphthalate	360	U	330	U	330	U	330	U
Acenaphthylene	360	U	330	U	330	U	330	U
2,6-Dinitrotoluene	360	U	330	U	330	U	330	U
3-Nitroaniline	910	U	830	U	830	U	830	U
Acenaphthene	360	U	330	U	330	U	74	%
2,4-Dinitrophenol	910	U	830	U	830	U	830	U
4-Nitrophenol	910	U	830	U	830	U	14	%
Dibenzofuran	360	U	330	U	330	U	330	U
2,4-Dinitrotoluene	360	U	330	U	330	U	77	%
Diethylphthalate	360	U	30	J	330	U	330	U
4-Chlorophenyl-phenylether	360	U	330	U	330	U	330	U
Fluorene	360	U	330	U	330	U	330	U
4-Nitroaniline	910	U	830	U	830	U	830	U
4,6-Dinitro-2-methylphenol	910	U	830	U	830	U	830	U
N-Nitrosodiphenylamine (1)	360	U	330	U	330	U	330	U
4-Bromophenyl-phenylether	360	U	330	U	330	U	330	U
Hexachlorobenzene	360	U	330	U	330	U	330	U
Pentachlorophenol	910	U	830	U	830	U	43	%
Phenanthrene	360	U	330	U	330	U	330	U
Anthracene	360	U	330	U	330	U	330	U
Carbazole	360	U	330	U	330	U	330	U
Di-n-butylphthalate	660 ~~27~~ 3/14/05 JB	U	660 ~~89~~ 3/14/05 JB	U	19	J	330	U
Fluoranthene	360	U	330	U	330	U	330	U
Pyrene	360	U	330	U	330	U	78	%
Butylbenzylphthalate	360	U	330	U	330	U	330	U
3,3'-Dichlorobenzidine	360	U	330	U	330	U	330	U
Benzo(a)anthracene	360	U	330	U	330	U	330	U
Chrysene	360	U	330	U	330	U	330	U
bis(2-Ethylhexyl)phthalate	660 ~~84~~ 3/14/05 JB	U	660 ~~97~~ 3/14/05 JB	U	250	J	60	JB
Di-n-octyl phthalate	360	U	330	U	330	U	330	U
Benzo(b)fluoranthene	360	U	330	U	330	U	330	U
Benzo(k)fluoranthene	360	U	330	U	330	U	330	U
Benzo(a)pyrene	360	U	330	U	330	U	330	U
Indeno(1,2,3-cd)pyrene	360	U	330	U	330	U	330	U
Dibenz(a,h)anthracene	360	U	330	U	330	U	330	U
Benzo(g,h,i)perylene	360	U	330	U	330	U	330	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

3/12/05

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU HANFORD B04-002
LVL#: 0501L688
SDG/SAF#: H2998/B04-002

W.O.#: 11343-606-001-9999-00
Date Received: 01-27-2005

SEMIVOLATILE

Six (6) soil samples were collected on 01-25-2005.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 02-02-2005 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 02-04-2005.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.

2. Samples were extracted and analyzed within required holding time.

3. Non-target compounds were detected in the samples.

4. All surrogate recoveries were within acceptance criteria.

5. All matrix spike recoveries were within acceptance criteria.

6. All blank spike recoveries were within acceptance criteria.

7. The method blank contained the common laboratory contaminants Bis (2-Ethylhexyl) phthalate and Di-n-butylphthalate at levels less than the CRQL.

8. Internal standard area and retention time criteria were met.

9. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

10. I certify, that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data, contained in this hard-copy data package, has been authorized, by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

2/14/05
Date

som\gorup\data\bna\mu-hanford\0501-688.doc

208 Welsh Pool Road • Exton, PA 19341- 1313 • (610) 280-3000 • Fax (610) 280-3041

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B04-002-027	Page 1 of 2

Collector Doug Bowers	Company Contact Doug Bowers	Telephone No. 531-0701	Project Coordinator KESSNER, JH
Project Designation 100 BC Burial Grounds - Soil Full Protocol	Sampling Location 100-B-16 100 BC		SAF No. B04-002
Ice Chest No. ERC 96 069	Field Logbook No. EFL 1173-3	COA R10B14 2600 ~~R100B12600~~ 1-21-05	Method of Shipment FED EX
Shipped To EBERLINE SERVICES (Formerly TMA) LVL1	Offsite Property No. A050083		Bill of Lading/Air Bill No. SEE 057C

Price Code: Many

Air Quality ☐

Data Turnaround: 21 days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

000017

Preservation	None	Cool 4C	Cool 4C
Type of Container	aG	aG	aG
No. of Container(s)	1	1	1
Volume	250mL	60mL	120mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)

Sample No.	Matrix *	Sample Date	Sample Time	See item (1)	PCBs - 8082	Semi-VOA - 8270A (TCL)
J02FL8	SOIL	1-25-05	1240	X	X	X
J02FL9	SOIL	↓	1231	X	X	X
J02FM0	SOIL	↓	1210	X	X	X
J02FM1	SOIL	↓	1222	X	X	X
J02FM2	SOIL	↓	1240	X	X	X

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Doug Bowers	1-25-05/1600	Ref 2C 3728	1-25-05/1600
REF 2C 3728	12605 1000	SJ GALE	12605 1000
SJ GALE	12605 1000	FED EX	
FedEx	01/27/05 1510	J. [illegible]	1/27/05 1510

SPECIAL INSTRUCTIONS

Samples are from a non-rad site.

(1) ICP Metals - 6010TR (Client List) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; Mercury - 7470 - (CV)

Personnel not available to relinquish samples from 3728 Ref # 2C on 1/26/05

Matrix *

S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (03/01/2002)

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B04-002-027 | Page 2 of 2

Collector: Doug Bowers	Company Contact: Doug Bowers	Telephone No.: 531-0701	Project Coordinator: KESSNER, JH
Price Code: Many	Data Turnaround: Air Quality 21 days		
Project Designation: 100 BC Burial Grounds - Soil Full Protocol	Sampling Location: 100-B-16 100 BC		SAF No.: B04-002
Ice Chest No.: ERC 9C 069	Field Logbook No.: EFL 1173-3	COA R10B16 2600 ~~R100B12600~~	Method of Shipment: FED EX
Shipped To: EBERLINE SERVICES (Formerly TMA) LVLI	Offsite Property No.: A050 083		Bill of Lading/Air Bill No.: SEE OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

0000018

Preservation	None	Cool 4C	Cool 4C									
Type of Container	aG	aG	aG									
No. of Container(s)	1	1	1									
Volume	250mL	60mL	120mL									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)									
Sample No.	Matrix *	Sample Date	Sample Time									
J02FM3	SOIL	1-25-05	1217	X	X	X						

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Doug Bowers Bowers	1-25-05/1600	Ref 3728 1-25-05	1600
REF 3728 2C	12605 1000	S J GALE	12605 1000
S J GALE	12605 1000	FED EX	
FedEx	1/27/05 1510	J Perry	1/27/05 1510

SPECIAL INSTRUCTIONS

Samples are from a non-rad site.

(1) ICP Metals - 6010TR (Client List) [Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver]; Mercury - 7470 - (CV)

Personnel not available to relinquish samples from 3728 Ref # 2C on 1/26/05

Matrix *: S=Soil; SE=Sediment; SO=Solid; SI=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; WI=Wipe; L=Liquid; V=Vegetation; X=Other

LABORATORY SECTION	Received By	Title	Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time	

BHI-EE-011 (03/01/2002)

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 100 BX 100-B-16			DATA PACKAGE: H2998		
VALIDATOR: TLI		LAB: LLI		DATE: 3/11/05	
			SDG: H2998		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	(SW-846 8270)		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J02FL8 J02FL9 J02FM0 J02FM1					
J02FM2 J02FM3					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No (N/A)

Initial calibrations acceptable? ..... Yes No (N/A)

Continuing calibrations acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No (N/A)
Calibration blank results acceptable? (Levels D, E) ..... Yes No (N/A)
Laboratory blanks analyzed? ..... (Yes) No N/A
Laboratory blank results acceptable? ..... Yes (No) N/A
Field/trip blanks analyzed? (Levels C, D, E) ..... (Yes) No N/A
Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: dinbutyl phthalate – U at CRDL
bis(2ethylhexyl)phthalate – U at CRDL

FB – diethyl phthalate, di-n-butyl phthalate, bis(2-ethylhexyl)phthal

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? ..... (Yes) No N/A
Surrogate/system monitoring compound recoveries acceptable? ..... (Yes) No N/A
Surrogates traceable? (Levels D, E) ..... Yes No (N/A)
Surrogates expired? (Levels D, E) ..... Yes No (N/A)
MS/MSD samples analyzed? ..... (Yes) No N/A
MS/MSD results acceptable? ..... (Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards? (Levels D, E) ..... Yes No (N/A)
LCS/BSS samples analyzed? ..... (Yes) No N/A
LCS/BSS results acceptable? ..... (Yes) No N/A
Standards traceable? (Levels D, E) ..... Yes No (N/A)
Standards expired? (Levels D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Performance audit sample(s) analyzed? ..... Yes (No) N/A
Performance audit sample results acceptable? ..... Yes No (N/A)

Comments: NO PAS

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A
MS/MSD RPD values acceptable? ..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A
MS/MSD standards expired? (Levels D, E) ..... Yes No N/A
Field duplicate RPD values acceptable? ..... Yes No N/A
Field split RPD values acceptable? ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No N/A
Iinternal standard areas acceptable? ..... Yes No N/A
Internal standard retention times acceptable? ..... Yes No N/A
Standards traceable? ..... Yes No N/A
Standards expired? ..... Yes No N/A
Transcription/calculation errors? ..... Yes No N/A

Comments: _____

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A
Sample holding times acceptable? ..... Yes No N/A

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A
Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A
Results reported for all requested analyses? ..... Yes No N/A
Results supported in the raw data? (Levels D, E) ..... Yes No N/A
Samples properly prepared? (Levels D, E) ..... Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E) ..... Yes No N/A
Detection limits meet RDL? ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: 48 over

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed? ..... Yes No N/A
GPC check performed? ..... Yes No N/A
GPC check recoveries acceptable? ..... Yes No N/A
GPC calibration performed? ..... Yes No N/A
GPC calibration check performed? ..... Yes No N/A
GPC calibration check retention times acceptable? ..... Yes No N/A
Check/calibration materials traceable? ..... Yes No N/A
Check/calibration materials Expired? ..... Yes No N/A
Analytical batch QC given similar cleanup? ..... Yes No N/A
Transcription/Calculation Errors? ..... Yes No N/A

Comments:

Date: 14 March 2005
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 BC Burial Grounds - Soil Full Protocol - Waste Site 100-B-16
Subject: PCB - Data Package No. H2998-LLI (SDG No. H2998)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2998-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
J02FL8	1/25/05	Soil	C	See note 1
J02FL9	1/25/05	Soil	C	See note 1
J02FM0	1/25/05	Soil	C	See note 1
J02FM1	1/25/05	Soil	C	See note 1
J02FM2	1/25/05	Soil	C	See note 1
J02FM3	1/25/05	Soil	C	See note 1

1 - PCBs by 8082.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, December 2001). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Method Blank**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than required quantitation limit (RQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than RQL, the result is qualified as undetected and elevated to the RQL.

All method blank target compound results were acceptable.

Field Blanks

One field blank (J02FM3) was submitted for analysis. No analytes were detected in the field blank.

- **Accuracy**

Matrix Spike & Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data . The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All accuracy spike results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J02FM1/J02FM2) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the Remaining Waste Sites RQLs to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

- **Completeness**

Data Package No. H2998-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 3, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

PCB DATA QUALIFICATION SUMMARY*

SDG: H2998	REVIEWER: TLI	DATE: 3/14/05	PAGE 1 OF 1
COMMENTS: No qualifiers assigned			

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

PCB ANALYSIS, SOIL MATRIX, (UG/KG)

Project: BECHTEL-HANFORD													
Laboratory: Lionville Laboratory Inc.													
Case:	SDG: H2998												
Sample Number		J02FL8		J02FL9		J02FM0		J02FM1		J02FM2		J02FM3	
Remarks										Duplicate		E. Blank	
Sample Date		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05	
Extraction Date		2/4/05		2/4/05		2/4/05		2/4/05		2/4/05		2/4/05	
Analysis Date		2/8/05		2/8/05		2/8/05		2/8/05		2/9/05		2/9/05	
PCB	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	20	15	U	15	U	14	U	16	U	15	U	13	U
Aroclor-1221	20	15	U	15	U	14	U	16	U	15	U	13	U
Aroclor-1232	20	15	U	15	U	14	U	16	U	15	U	13	U
Aroclor-1242	20	15	U	15	U	14	U	16	U	15	U	13	U
Aroclor-1248	20	15	U	15	U	14	U	16	U	15	U	13	U
Aroclor-1254	20	15	U	15	U	14	U	16	U	15	U	13	U
Aroclor-1260	20	15	U	15	U	24		16	U	15	U	13	U

000010

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.

PCBs by GC

Report Date: 02/09/05 09:47

RFW Batch Number: 0501L688 Client: TNUHANFORD B04-002 H2998 Work Order: 11343606001 Page: 1

	Cust ID:	J02FL8	J02FL9	J02FM0	J02FM0	J02FM0	J02FM1
Sample Information	RFW#:	001	002	003	003 MS	003 MSD	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	82 %	82 %	74 %	85 %	84 %	79 %
	Decachlorobiphenyl	90 %	86 %	80 %	90 %	88 %	86 %
Aroclor-1016		15 U	15 U	14 U	84 %	80 %	16 U
Aroclor-1221		15 U	15 U	14 U	14 U	14 U	16 U
Aroclor-1232		15 U	15 U	14 U	14 U	14 U	16 U
Aroclor-1242		15 U	15 U	14 U	14 U	14 U	16 U
Aroclor-1248		15 U	15 U	14 U	14 U	14 U	16 U
Aroclor-1254		15 U	15 U	14 U	14 U	14 U	16 U
Aroclor-1260		15 U	15 U	24	84 %	78 %	16 U

	Cust ID:	J02FM2	J02FM3	PBLKFT	PBLKFT BS
Sample Information	RFW#:	005	006	05LE0091-MB1	05LE0091-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	76 %	80 %	78 %	82 %
	Decachlorobiphenyl	82 %	85 %	82 %	90 %
Aroclor-1016		15 U	13 U	13 U	75 %
Aroclor-1221		15 U	13 U	13 U	13 U
Aroclor-1232		15 U	13 U	13 U	13 U
Aroclor-1242		15 U	13 U	13 U	13 U
Aroclor-1248		15 U	13 U	13 U	13 U
Aroclor-1254		15 U	13 U	13 U	13 U
Aroclor-1260		15 U	13 U	13 U	83 %

0000011

VC 3/12/05

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC.

2/11/05

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU HANFORD B04-002
LVL#: 0501L688
SDG/SAF#: H2998/B04-002

W.O.#: 11343-606-001-9999-00
Date Received: 01-27-2005

PCB

Six (6) soil samples were collected on 01-25-2005.

The samples and their associated QC samples were extracted on 02-04-2005 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 02-08,09-2005. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.

2. Samples were extracted and analyzed within required holding time.

3. The samples and their associated QC samples received Copper-Sulfur and Sulfuric Acid cleanups according to Lionville Laboratory SOPs based on SW846 methods 3660A and 3665A respectively.

4. The method blank was below the reporting limits for all target compounds.

5. All surrogate recoveries were within acceptance criteria.

6. The blank spike recoveries were within acceptance criteria.

7. All matrix spike recoveries were within acceptance criteria.

8. All initial calibrations associated with this data set were within acceptance criteria.

9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

2/14/05
Date

000013

som\r:\group\data\pest\tnu hanford\0501-688.pcb

208 Welsh Pool Road • Exton, PA 19341- 1313 • (610) 280-3000 • Fax (610) 280-3041

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B04-002-027	Page 1 of 2

Collector: Doug Bowers	Company Contact: Doug Bowers — Telephone No.: 531-0701	Project Coordinator: KESSNER, JH	Price Code: Many — Data Turnaround: Air Quality ☐ 21 day
Project Designation: 100 BC Burial Grounds - Soil Full Protocol	Sampling Location: 100-B-16 100 BC	SAF No.: B04-002	
Ice Chest No.: ERC 96069	Field Logbook No.: EFL 1173-3 — COA: R10B162600 ~~R100B12600~~ RB 1-21-05	Method of Shipment: FED EX	
Shipped To: EBERLINE SERVICES (Formerly TMA) LVLI	Offsite Property No.: A050083	Bill of Lading/Air Bill No.: SEE 08JC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

0000147

SAMPLE ANALYSIS	Preservation	None	Cool 4C	Cool 4C								
	Type of Container	aG	aG	aG								
	No. of Container(s)	1	1	1								
	Volume	250mL	60mL	120mL								
		See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)								

Sample No.	Matrix *	Sample Date	Sample Time									
J02FL8	SOIL	1-25-05	1240	X	X	X						
J02FL9	SOIL	↓	1231	X	X	X						
J02FM0	SOIL		1210	X	X	X						
J02FM1	SOIL		1222	X	X	X						
J02FM2	SOIL	↓	1240	X	X	X						

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: Doug Bowers	Date/Time: 1-25-05/1600	Received By/Stored In: Ref 2C 3728	Date/Time: 1-25-05/1600
Relinquished By/Removed From: REF 2C 3728	Date/Time: 12605 1000	Received By/Stored In: SJ GALES	Date/Time: 12605 1000
Relinquished By/Removed From: SJ GALES	Date/Time: 12605 1000	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: FedEx	Date/Time: 01/27/05 1500	Received By/Stored In: JKung	Date/Time: 1/27/05 1510
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

Samples are from a non-rad site.

(1) ICP Metals - 6010TR (Client List) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; Mercury - 7470 - (CV)

Personnel not available to relinquish samples from 3728 Ref # 2C on 1/26/05

Matrix *

S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (03/01/2002)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B04-002-027	Page 2 of 2
Collector: Doug Bowers	Company Contact: Doug Bowers	Telephone No.: 531-0701	Project Coordinator: KESSNER, JH	Price Code: Many / Data Turnaround: Air Quality: 21 days
Project Designation: 100 BC Burial Grounds - Soil Full Protocol	Sampling Location: 100-B-16 100 BC		SAF No.: B04-002	
Ice Chest No.: ERC 96 069	Field Logbook No.: EFL 1173-3	COA: R10B162600 ~~R100B12600~~	Method of Shipment: FED EX	
Shipped To: EBERLINE SERVICES (Formerly TMA) (LVL1)	Offsite Property No.: A050 083		Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

000015

SAMPLE ANALYSIS													
Preservation				None	Cool 4C	Cool 4C							
Type of Container				aG	aG	aG							
No. of Container(s)				1	1	1							
Volume				250mL	60mL	120mL							
				See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)							
Sample No.	Matrix *	Sample Date	Sample Time										
J02FM3	SOIL	1-25-05	1237	X	X	X							

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: D049 Doug Bowers	Date/Time: 1-25-05 1600	Received By/Stored In: Ref 3728	Date/Time: 1-25-05 1600
Relinquished By/Removed From: REF 3728 2C	Date/Time: 12605 1000	Received By/Stored In: SJ GALE	Date/Time: 12605 1000
Relinquished By/Removed From: SJ GALE	Date/Time: 12605 1000	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: FedEx	Date/Time: 1/27/05 1510	Received By/Stored In: J Plum	Date/Time: 1/27/05 1510
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

Samples are from a non-rad site.

(1) ICP Metals - 6010TR (Client List) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; Mercury - 7470 - (CV)

Personnel not available to relinquish samples from 3728 Ref # 2C on 1/26/05

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (03/01/2002)

Appendix 5

Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100BC 100-B-16			DATA PACKAGE: H2998		
VALIDATOR: TLI		LAB: LLI		DATE: 3/16/05	
			SDG: H2998		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
J02FL8 J02FL9 J02FM0 J02FM1					
J02FM2 J02FM3					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable? ..... Yes No (N/A)

Continuing calibrations acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

DDT and endrin breakdowns acceptable? ..... Yes No (N/A)

Comments: _____

PCB DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A
Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A
Laboratory blanks analyzed? ..... Yes No N/A
Laboratory blank results acceptable? ..... Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed? ..... Yes No N/A
Surrogate recoveries acceptable? ..... Yes No N/A
Surrogates traceable? (Levels D, E) ..... Yes No N/A
Surrogates expired? (Levels D, E) ..... Yes No N/A
MS/MSD samples analyzed? ..... Yes No N/A
MS/MSD results acceptable? ..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A
MS/MSD standards expired? (Levels D, E) ..... Yes No N/A
LCS/BSS samples analyzed? ..... Yes No N/A
LCS/BSS results acceptable? ..... Yes No N/A
Standards traceable? (Levels D, E) ..... Yes No N/A
Standards expired? (Levels D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A
Performance audit sample(s) analyzed? ..... Yes No N/A
Performance audit sample results acceptable? ..... Yes No N/A

Comments: _____

PCB DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... (Yes) No N/A
Duplicate results acceptable? ..... (Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)
Field duplicate RPD values acceptable? ..... (Yes) No N/A
Field split RPD values acceptable? ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: _____

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable? ..... Yes No (N/A)
Positive results resolved acceptably? ..... Yes No (N/A)
Comments: _____

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... (Yes) No N/A
Sample holding times acceptable? ..... (Yes) No N/A
Comments: _____

PCB DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes	No	N/A
Compound quantitation acceptable? (Levels D, E)	Yes	No	N/A
Results reported for all requested analyses?	Yes	No	N/A
Results supported in the raw data? (Levels D, E)	Yes	No	N/A
Samples properly prepared? (Levels D, E)	Yes	No	N/A
Detection limits meet RDL?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments:_____

9. SAMPLE CLEANUP (Levels D and E)

Fluoricil ® (or other absorbent) cleanup performed?	Yes	No	N/A
Lot check performed?	Yes	No	N/A
Check recoveries acceptable?	Yes	No	N/A
GPC cleanup performed?	Yes	No	N/A
GPC check performed?	Yes	No	N/A
GPC check recoveries acceptable?	Yes	No	N/A
GPC calibration performed?	Yes	No	N/A
GPC calibration check performed?	Yes	No	N/A
GPC calibration check retention times acceptable?	Yes	No	N/A
Check/calibration materials traceable?	Yes	No	N/A
Check/calibration materials Expired?	Yes	No	N/A
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments:_____

Date: 14 March 2005
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 BC Burial Grounds - Soil Full Protocol - Waste Site 100-B-16
Subject: Inorganics - Data Package No. H2998-LLI (SDG No. H2998)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2998-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
J02FL8	1/25/05	Soil	C	See note 1
J02FL9	1/25/05	Soil	C	See note 1
J02FM0	1/25/05	Soil	C	See note 1
J02FM1	1/25/05	Soil	C	See note 1
J02FM2	1/25/05	Soil	C	See note 1
J02FM3	1/25/05	Soil	C	See note 1

1 - ICP metals (6010B) and mercury (7471A).

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, December 2001). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for mercury and 6 months for ICP metals.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

Due to method blank contamination, the chromium result in sample J02FM3 was qualified as an estimate and flagged "UJ".

All other preparation blank results were acceptable.

Field (Equipment) Blank

One field blank (J02FM3) was submitted for analysis. Barium, chromium and lead were detected in the equipment blank. Under the BHI statement of work, no qualification is required.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data . The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are

qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a MS recovery of 39.5%, all barium results were qualified as estimates and flagged "J".

Due to an LCS recovery of 69%, all silver results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD of 73.6%, all barium results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicate samples (J02FM1/J02FM2) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. All reported results met the analyte specific RQL.

- **Completeness**

Data package No. H2998-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to method blank contamination, the chromium result in sample J02FM3 was qualified as an estimate and flagged "UJ". Due to a MS recovery of 39.5%, all barium results were qualified as estimates and flagged "J". Due to an LCS recovery of 69%, all silver results were qualified as estimates and flagged "J". Due to an RPD of 73.6%, all barium results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 3, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

INORGANIC DATA QUALIFICATION SUMMARY*

SDG: H2998	REVIEWER: TLI	DATE: 3/14/05	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Chromium	UJ	J02FM3	Blank contamination
Silver	J	All	LCS
Barium	J	All	RPD & MS

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD													
Laboratory: LLI													
Case	SDG: H2998												
Sample Number		J02FL8		J02FL9		J02FM0		J02FM1		J02FM2		J02FM3	
Remarks										Duplicate		E. Blank	
Sample Date		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05	
Inorganics	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	0.2	0.05	UJ	0.05	UJ	0.05	UJ	0.06	UJ	1.5	J	0.05	UJ
Arsenic		3.0		3.3		2.7		2.9		3.1		0.28	U
Barium	20	226	J	177	J	71.7	J	83.0	J	108	J	58.2	J
Cadmium	0.2	0.23		0.36		0.23		0.26		0.27		0.04	U
Chromium	1	11.7		12.5		9.3		15.4		10.7		0.05	UJ
Mercury	0.2	0.02	U	0.03		0.02	U	0.01	U	0.02	U	0.01	U
Lead	5	8.1		8.7		5.4		7.9		6.9		8.2	
Selenium	1	0.42	U	0.41	U	0.41	U	0.46	U	0.43	U	0.39	U

000010

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/05

CLIENT: TNUHANFORD B04-002 H2998 LVL LOT #: 0501L688

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J02FL8	Silver, Total	0.05 u	J	MG/KG	0.05	1.0
		Arsenic, Total	3.0		MG/KG	0.30	1.0
		Barium, Total	226	J	MG/KG	0.02	1.0
		Cadmium, Total	0.23		MG/KG	0.04	1.0
		Chromium, Total	11.7		MG/KG	0.04	1.0
		Mercury, Total	0.02 u		MG/KG	0.02	1.0
		Lead, Total	8.1		MG/KG	0.20	1.0
		Selenium, Total	0.42 u		MG/KG	0.42	1.0
-002	J02FL9	Silver, Total	0.05 u	J	MG/KG	0.05	1.0
		Arsenic, Total	3.3		MG/KG	0.30	1.0
		Barium, Total	177	J	MG/KG	0.02	1.0
		Cadmium, Total	0.36		MG/KG	0.04	1.0
		Chromium, Total	12.5		MG/KG	0.04	1.0
		Mercury, Total	0.03		MG/KG	0.01	1.0
		Lead, Total	8.7		MG/KG	0.20	1.0
		Selenium, Total	0.41 u		MG/KG	0.41	1.0
-003	J02FM0	Silver, Total	0.05 u	J	MG/KG	0.05	1.0
		Arsenic, Total	2.7		MG/KG	0.30	1.0
		Barium, Total	71.7	J	MG/KG	0.02	1.0
		Cadmium, Total	0.23		MG/KG	0.04	1.0
		Chromium, Total	9.3		MG/KG	0.04	1.0
		Mercury, Total	0.02 u		MG/KG	0.02	1.0
		Lead, Total	5.4		MG/KG	0.19	1.0
		Selenium, Total	0.41 u		MG/KG	0.41	1.0

3/12/05

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/05

CLIENT: TNUHANFORD B04-002 H2998 LVL LOT #: 0501L688

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-004	J02FM1	Silver, Total	0.06 u J	MG/KG	0.06	1.0
		Arsenic, Total	2.9	MG/KG	0.33	1.0
		Barium, Total	83.0 J	MG/KG	0.02	1.0
		Cadmium, Total	0.26	MG/KG	0.05	1.0
		Chromium, Total	15.4	MG/KG	0.05	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Lead, Total	7.9	MG/KG	0.22	1.0
		Selenium, Total	0.46 u	MG/KG	0.46	1.0
-005	J02FM2	Silver, Total	1.5 J	MG/KG	0.05	1.0
		Arsenic, Total	3.1	MG/KG	0.31	1.0
		Barium, Total	108 J	MG/KG	0.02	1.0
		Cadmium, Total	0.27	MG/KG	0.04	1.0
		Chromium, Total	10.7	MG/KG	0.04	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	6.9	MG/KG	0.21	1.0
		Selenium, Total	0.43 u	MG/KG	0.43	1.0
-006	J02FM3	Silver, Total	0.05 u J	MG/KG	0.05	1.0
		Arsenic, Total	0.28 u	MG/KG	0.28	1.0
		Barium, Total	58.2 J	MG/KG	0.02	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.05 VJ	MG/KG	0.04	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Lead, Total	8.2	MG/KG	0.18	1.0
		Selenium, Total	0.39 u	MG/KG	0.39	1.0

3/12/05

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B04-002
LVL#: 0501L688
SDG/SAF#: H2998/B04-002

W.O.#: 11343-606-001-9999-00
Date Received: 01-27-05

METALS CASE NARRATIVE

1. This narrative covers the analyses of 6 soil samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silver at 69.2%. Refer to the Inorganics Laboratory Control Standards Report.

10. The matrix spike (MS) recovery for 1 analyte was outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration level for the following analytes:

208 Welsh Pool Road • Exton, PA 19341- 1313 • (610) 280-3000 • Fax (610) 280-3041

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J02FL8	Barium	300	104.4

12. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

2/10/00
Date

jjw/m01-688

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B04-002-027	Page 1 of 2

Collector: Doug Bowers	Company Contact: Doug Bowers — Telephone No.: 531-0701	Project Coordinator: KESSNER, JH	Price Code: Many — Data Turnaround: Air Quality ☐ 21 day
Project Designation: 100 BC Burial Grounds - Soil Full Protocol	Sampling Location: 100-B-16 100 BC	SAF No.: B04-002	
Ice Chest No.: ERC 96 069	Field Logbook No.: EFL 1173-3 — COA: R10816260 ~~R100B12600~~ 1-21-05	Method of Shipment: FED EX	
Shipped To: EBERLINE SERVICES (Formerly TMA) LVLI	Offsite Property No.: A050083	Bill of Lading/Air Bill No.: See 08JC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	Cool 4C	Cool 4C								
Type of Container	aG	aG	aG								
No. of Container(s)	1	1	1								
Volume	250mL	60mL	120mL								
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)								
Sample No.	Matrix *	Sample Date	Sample Time								
J02FL8	SOIL	1-25-05	1240	X	X	X					
J02FL9	SOIL	↓	1231	X	X	X					
J02FM0	SOIL	↓	1210	X	X	X					
J02FM1	SOIL	↓	1222	X	X	X					
J02FM2	SOIL	↓	1240	X	X	X					

000016

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: Doug Bowers	Date/Time: 1-25-05/1600	Received By/Stored In: Ref 2C 3728	Date/Time: 1-25-05/1600
Relinquished By/Removed From: REF 2C 3728	Date/Time: 12605 1000	Received By/Stored In: SJ GALE	Date/Time: 12605 1000
Relinquished By/Removed From: SJ GALE	Date/Time: 12605 1000	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: FedEx	Date/Time: 01/27/05 1500	Received By/Stored In: JRLuny	Date/Time: 1/27/05 1510
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

Samples are from a non-rad site.

(1) ICP Metals - 6010TR (Client List) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; Mercury - 7470 - (CV)

Personnel not available to relinquish samples from 3728 Ref # 2C on 1/26/05

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (03/01/2002)

0000000315

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B04-002-027	Page 2 of 2
Collector Doug Bowers	Company Contact Doug Bowers	Telephone No. 531-0701	Project Coordinator KESSNER, JH	Price Code Many Data Turnaround Air Quality 21 days
Project Designation 100 BC Burial Grounds - Soil Full Protocol	Sampling Location 100-B-16 100 BC		SAF No. B04-002	
Ice Chest No. ERC 96 069	Field Logbook No. EFL 1173-3	COA R10B162600 ~~R100B12600~~	Method of Shipment FED EX	
Shipped To EBERLINE SERVICES (Formerly TMA) LVLI	Offsite Property No. A050083		Bill of Lading/Air Bill No. SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS Special Handling and/or Storage	Preservation	None	Cool 4C	Cool 4C							
	Type of Container	aG	aG	aG							
	No. of Container(s)	1	1	1							
	Volume	250mL	60mL	120mL							
100000	SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)							
Sample No.	Matrix *	Sample Date	Sample Time								
J02FM3	SOIL	1-25-05	1237	X	X	X					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From Doug Bowers	Date/Time 1-25-05 1600	Received By/Stored In Ref 3728	Date/Time 1-25-05 1600
Relinquished By/Removed From REF 3728 2C	Date/Time 12605 1000	Received By/Stored In S J GALE	Date/Time 12605 1000
Relinquished By/Removed From S J GALE	Date/Time 12605 1000	Received By/Stored In FED EX	Date/Time
Relinquished By/Removed From FedEx	Date/Time 1/27/05 1510	Received By/Stored In J Perry	Date/Time 1/27/05 1510
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

Samples are from a non-rad site.

(1) ICP Metals - 6010TR (Client List) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; Mercury - 7470 - (CV)

Personnel not available to relinquish samples from 3728 Ref # 2C on 1/26/05

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (03/01/2002)

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100 BC 100-B-16			DATA PACKAGE: H2998		
VALIDATOR: TLI		LAB: LLI		DATE: 3/10/03	
			SDG: H2993		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J02FL8 J02FL9 J02FM0 J02FM1					
J02FM2 J02FM3					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No (N/A)

Initial calibrations acceptable? ..... Yes No N/A

ICP interference checks acceptable? ..... Yes No N/A

ICV and CCV checks performed on all instruments? ..... Yes No N/A

ICV and CCV checks acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes	No	(N/A)
ICB and CCB results acceptable? (Levels D, E)	Yes	No	(N/A)
Laboratory blanks analyzed?	(Yes)	No	N/A
Laboratory blank results acceptable?	Yes	(No)	N/A
Field blanks analyzed? (Levels C, D, E)	(Yes)	No	N/A
Field blank results acceptable? (Levels C, D, E)	Yes	(No)	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)

Comments: CR - UJ In FM3

FB - barium, chromium, lead

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed?	(Yes)	No	N/A
MS/MSD results acceptable?	Yes	(No)	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/MSD standards expired? (Levels D, E)	Yes	No	(N/A)
LCS/BSS samples analyzed?	(Yes)	No	N/A
LCS/BSS results acceptable?	Yes	(No)	N/A
Standards traceable? (Levels D, E)	Yes	No	(N/A)
Standards expired? (Levels D, E)	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	(No)	N/A
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments: Barium - 397% MS - J all

Silver - 699% LCS - J all

No PAS

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes	(No)	N/A
Duplicate results acceptable?	Yes	(No)	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/MSD standards expired? (Levels D, E)	Yes	No	(N/A)
Field duplicate RPD values acceptable?	(Yes)	No	N/A
Field split RPD values acceptable?	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)

Comments: Barium - RPD 73.6% J all

6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed?	Yes	No	(N/A)
ICP serial dilution %D values acceptable?	Yes	No	(N/A)
ICP post digestion spike required?	Yes	No	(N/A)
ICP post digestion spike values acceptable?	Yes	No	(N/A)
Standards traceable?	Yes	No	(N/A)
Standards expired?	Yes	No	(N/A)
Transcription/calculation errors?	Yes	No	(N/A)

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required? ..... Yes No N/A

Duplicate injection %RSD values acceptable? ..... Yes No N/A

Analytical spikes performed as required? ..... Yes No N/A

Analytical spike recoveries acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

MSA performed as required? ..... Yes No N/A

MSA results acceptable? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments: _____

8. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... Yes No N/A

Rresults supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 02/10/05

CLIENT: TNUHANFORD B04-002 H2998 LVL LOT #: 0501L688

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	05L0067-MB1	Silver, Total	0.05	MG/KG	0.05	1.0
		Arsenic, Total	0.29 u	MG/KG	0.29	1.0
		Barium, Total	0.04	MG/KG	0.02	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.07	MG/KG	0.04	1.0
		Lead, Total	0.19 u	MG/KG	0.19	1.0
		Selenium, Total	0.40 u	MG/KG	0.40	1.0
BLANK1	05C0024-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 02/10/05

CLIENT: TNUHANFORD B04-002 H2998 LVL LOT #: 0501L688

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J02FL8	Silver, Total	5.2	0.05u	5.5	94.5	1.0
		Arsenic, Total	206	3.0	219	92.8	1.0
		Barium, Total	313	226	219	39.5	1.0
		Cadmium, Total	5.3	0.23	5.5	92.2	1.0
		Chromium, Total	31.7	11.7	21.9	91.3	1.0
		Mercury, Total	0.17	0.02u	0.17	100.6	1.0
		Lead, Total	58.4	8.1	54.8	91.8	1.0
		Selenium, Total	196	0.42u	219	89.6	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 02/10/05

CLIENT: TNUHANFORD B04-002 H2998 LVL LOT #: 0501L688

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J02FL8	Silver, Total	0.05u	0.05u	NC	1.0
		Arsenic, Total	3.0	3.0	0.00	1.0
		Barium, Total	226	105	73.6	1.0
		Cadmium, Total	0.23	0.23	0.26	1.0
		Chromium, Total	11.7	9.6	19.7	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Lead, Total	8.1	8.1	0.00	1.0
		Selenium, Total	0.42u	0.43u	NC	1.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 02/10/05

CLIENT: TNUHANFORD B04-002 H2998 LVL LOT #: 0501L688

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	05L0067-LC1	Silver, LCS	34.6	50.0	MG/KG	69.2
		Arsenic, LCS	949	1000	MG/KG	94.9
		Barium, LCS	491	500	MG/KG	98.1
		Cadmium, LCS	24.4	25.0	MG/KG	97.6
		Chromium, LCS	50.4	50.0	MG/KG	100.8
		Lead, LCS	248	250	MG/KG	99.2
		Selenium, LCS	931	1000	MG/KG	93.1
LCS1	05C0024-LC1	Mercury, LCS	7.0	6.2	MG/KG	113.6